## *Transits, Occultations, and Eclipses of Jupiter's Satellites, during the Year* 1877.

(Observers—T., Mr. Todd; R., Mr. Ringwood.)

| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. h m s | Corresponding G.M.T. h m s | Time by *Nautical Almanac.* h m s | Apparent Error of *Nautical Almanac.* m s | Power. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | First seen | 8 53 27·1 | 23 39 5·8 | 23 39 | | 200 |
| 2 | June 1 8 54 | T. | I Sh. I. | About bisected | 8 54 29·1 | 23 40 7·8 | | | ,, |
| 3 | | | | Internal contact | 8 55 39·1 | 23 41 17·8 | | | ,, |
| 4 | | | | First contact | 9 17 52·1 | 0 3 30·8 | 0 5 | | ,, |
| 5 | 9 20 | T. | I Tr. I. | Bisected | 9 19 58·1 | 0 5 36·8 | | | ,, |
| 6 | | | | Internal contact | 9 21 36·6 | 0 7 15·3 | | | ,, |
| 7 | | | | Internal contact | 11 5 9·9 | 1 50 48·6 | | | ,, |
| 8 | 11 6 | T. | I Sh. E. | Bisected | 11 6 39·9 | 1 52 18·6 | | | ,, |
| 9 | | | | Limb complete | 11 8 13·9 | 1 53 52·6 | 1 54 | | ,, |
| 10 | | | | Internal contact | 11 30 46·4 | 2 16 25·1 | | | ,, |
| 11 | 11 32 | T. | I Tr. E. | Bisected | 11 32 12·9 | 2 17 51·6 | | | ,, |
| 12 | | | | External contact | 11 34 19·9 | 2 19 58·6 | 2 21 | | ,, |
| 13 | | | | First seen | 7 34 52·3 | 22 20 31·0 | 22 27 | | ,, |
| 14 | June 2 7 40 | T. | III Oc. R. | About bisected | 7 38 52·3 | 22 24 31·0 | | | ,, |
| 15 | | | | External contact | 7 42 32·3 | 22 28 11·0 | | | ,, |

*Remarks.*

Ref. No.
1 Limb slightly indented.
10 Very exact.
12 Good observation.

Ref. No.
13, 14, 15 A little late. Planet ill defined and hazy.

B 2

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

1878MNRAS..39....3T

| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. | Corresponding G.M.T. | Time by *Nautical Almanac.* | Apparent Error of *Nautical Almanac.* | Power. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | h m s | h m s | h m s | m s | |
| 16 | | | | First seen | 8 51 44·2 | 23 37 22·9 | 23 39 | | 200 |
| 17 | June 2 8 53 | T. | I | Oc. R. About bisected | 8 52 55·2 | 23 38 33·9 | | | ,, |
| 18 | | | | External contact | 8 54 40·2 | 23 40 18·9 | | | ,, |
| 19 | | | | External contact | | | 0 25 | | ,, |
| 20 | June 3 9 43 | T. | II | Sh. I. Internal contact | 9 43 31·8 | 0 29 10·5 | | | ,, |
| 21 | | | | External contact | 10 26 1·7 | 1 11 40·4 | 1 12 | | ,, |
| 22 | 10 28 | T. | II | Tr. I. Bisected | 10 28 21·7 | 1 14 0·4 | | | ,, |
| 23 | | | | Internal contact | 10 30 21·7 | 1 16 0·4 | | | ,, |
| 24 | June 9 7 20 | T. | III | Ec. D. | 7 20 34·1 | 22 6 12·8 | 22 4 40 | −1 32·8 | 125 |
| 25 | 8 9 | T. | I | Ec. D. | 8 8 45·0 | 22 54 23·7 | 22 54 3 | −0 20·7 | ,, |
| 26 | | | | First seen | 10 35 38·7 | 1 21 17·4 | 1 23 | | 200 |
| 27 | 10 37 | T. | I | Oc. R. Bisected | 10 37 8·7 | 1 22 47·4 | | | ,, |
| 28 | | | | External contact | 10 38 38·7 | 1 24 17·4 | | | ,, |
| 29 | | | | First seen | 10 52 33·7 | 1 38 12·4 | 1 45 | | ,, |
| 30 | 10 52 | T. | III | Oc. R. Bisected | 10 56 8·7 | 1 41 47·4 | | | ,, |
| 31 | | | | External contact | 11 0 3·7 | 1 45 42·4 | | | ,, |
| 32 | | | | Very dim | 6 30 32·5 | 21 16 11·2 | | | 125 |
| 33 | June 12 6 30 | R. | II | Ec. D. Just visible | 6 30 52·5 | 21 16 31·2 | | | ,, |
| 34 | | | | Disappeared | 6 31 2·5 | 21 16 41·2 | 21 16 9 | −0 32·2 | ,, |
| 35 | | | | First seen | | | 0 23 | | ,, |
| 36 | 9 36 | R. | II | Oc. R. Past bisection | 9 36 53·8 | 0 22 32·5 | | | ,, |
| 37 | | | | External contact | 9 37 19·3 | 0 22 58·0 | | | ,, |

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | June 16 | 10 3 | T. | I | Ec. D. | | 10 3 13·1 | 0 48 51·8 | 0 48 21 | −0 30·8 | | ,, |
| 39 | | 11 20 | T. | III | Ec. D. | | 11 19 43·5 | 2 5 22·2 | 2 3 22 | −2 0·2 | | ,, |
| 40 | | | | | | External contact | 7 12 3·1 | 21 57 41·8 | 21 59 | | | 200 |
| 41 | June 17 | 7 13 | T. | I | Tr. I. | Bisected | 7 13 33·1 | 21 59 11·8 | | | | ,, |
| 42 | | | | | | Internal contact | 7 15 23·1 | 22 1 1·8 | | | | ,, |
| 43 | | | | | | Internal contact | 9 21 56·0 | 0 7 34·7 | | | | ,, |
| 44 | | 9 24 | T. | I | Sh. E. | About bisected | 9 23 3·0 | 0 8 41·7 | | | | ,, |
| 45 | | | | | | Last seen | 9 24 9·0 | 0 9 47·7 | 0 11 | | | ,, |

*Remarks.*

Ref. No.

18 Good observation.
19 Lost; came too late.
20 Not good; badly defined; sky hazy.
21, 22, 23 Good; fair definition.
24 Very exact; planet wretchedly defined.
25 Good observation.
26, 27, 28 Not well defined.
29 May be a little late.
30, 31 Good.
Planet not very well defined; clouds passing. Had an impression that I saw half the satellite through edge of planet.
33 A mere speck of light.
35 Lost, through clouds.
37 Doubtful.

Ref. No.

38 Very good; disappearing close to planet, which was beautifully defined. Closeness to planet may affect time of disappearance.
39 Very exact; close proximity to planet may, however, affect observation; definition splendid.
40, 41, 42 The satellite entered the planet on the northern margin of the dark belt north of the planet's equator, and its shadow, which preceded it, was not seen till $7^h$ $16^m$, when it appeared in almost tangential contact with satellite, which could be followed for a considerable space across the disk of the planet; the shadow was very sharply defined. Passing clouds partially obscured the planet at times, and the limb was often wavy and tremulous, but the times noted were considered good.
43, 44, 45 Five minutes before internal contact of shadow, the shadow and satellite appeared to be in contact, both, but especially shadow, being sharply defined.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

1878MNRAS..39....3T



| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. | Corresponding G.M.T. | Time by *Nautical Almanac.* | Apparent Error of *Nautical Almanac.* | Power. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | h m s | h m s | h m s | m s | |
| 46 | | | | Internal contact | 9 24 29·0 | 0 10 7·7 | | | 200 |
| 47 | June 17 9 27 | T. | I Tr. E. | Bisected | 9 25 51·0 | 0 11 29·7 | | | ,, |
| 48 | | | | External contact | 9 27 43·0 | 0 13 21·7 | 0 14 | | ,, |
| 49 | | | | First seen | 6 45 59·0 | 21 31 37·7 | 21 33 | | 125 |
| 50 | June 18 6 47 | T. | I Oc. R. | About bisected | 6 47 0·5 | 21 32 39·2 | | | ,, |
| 51 | | | | External contact | 6 48 19·5 | 21 33 58·2 | | | ,, |
| 52 | | | | External contact | 9 1 18·1 | 23 46 56·8 | | | 200 |
| 53 | June 19 9 5 | R. | II Oc. D. | About bisected | 9 3 29·6 | 23 49 8·3 | | | ,, |
| 54 | | | | Internal contact | 9 5 14·6 | 23 50 53·3 | 23 50 | | ,, |
| 55 | | | | Last seen | 9 5 29·1 | 23 51 7·8 | | | ,, |
| 56 | | | | External contact | 8 55 53·8 | 23 41 32·5 | 23 42 | | ,, |
| 57 | June 24 8 57 | T. | I Tr. I. | Bisected | 8 57 11·8 | 23 42 50·5 | | | ,, |
| 58 | | | | Internal contact | 8 58 43·8 | 23 44 22·5 | | | ,, |
| 59 | | | | First seen | 9 2 34·8 | 23 48 13·5 | 23 49 | | ,, |
| 60 | 9 4 | T. | I Sh. I. | About bisected | 9 3 54·8 | 23 49 33·5 | | | ,, |
| 61 | | | | Internal contact | 9 5 39·8 | 23 51 18·5 | | | ,, |
| 62 | | | | First seen | 8 37 6·3 | 23 22 45·0 | 23 23 4 | +0 19·0 | ,, |
| 63 | June 25 8 37 | R. | I Ec. R. | Quite distinct | 8 37 37·8 | 23 23 16·5 | | | ,, |
| 64 | | | | Full blaze | 8 39 17·8 | 23 24 56·5 | | | ,, |

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | | | | | | | | | | | |
| 66 | June 27 | 6 58 | T. | III | Tr. E. | Internal contact | 6 54 38·0 | 21 40 16·7 | | | ,, |
| 67 | | | | | | About bisected | 6 57 57·5 | 21 43 36·2 | | | ,, |
| | | | | | | External contact | 7 1 59·0 | 21 47 37·7 | 21 51 | | ,, |
| 68 | | | | | | Internal contact | 7 41 9·0 | 22 26 47·7 | | | ,, |
| 69 | | 7 45 | T. | III | Sh. E. | About bisected | 7 44 59·0 | 22 30 37·7 | | | ,, |
| 70 | | | | | | Limb complete | 7 48 4·0 | 22 33 42·7 | 22 36 | | ,, |
| 71 | June 28 | 6 47 | T. | II | Sh. I. | External contact | | | 21 30 | | ,, |
| 72 | | | | | | Nearly bisected | 6 47 20·1 | 21 32 58·8 | | | ,, |
| 73 | | | | | | Internal contact | 9 1 26·1 | 23 47 4·8 | | | ,, |
| 74 | | 9 4 | T. | II | Tr. E. | About bisection | 9 4 30·4 | 23 50 9·1 | | | ,, |
| 75 | | | | | | External contact | 9 6 19·9 | 23 51 58·6 | 23 53 | | ,, |

*Remarks.*

Ref. No.
49 Considered rather late; thin fog clouds over sky.
52 Good.
54, 55 Very good; the satellite disappeared behind white cloud belt, but did not finally disappear till within the limb, or about $14\frac{1}{2}^{s}$ after time noted of internal contact.
56, 57, 58, 59, 60, 61 Good; satellite and shadow entered on dark belt north of equator; definition of planet superb.

Ref. No.
62, 63, 64 A mere speck. Very good; well defined; Moon close by.
65, 66, 67 Difficult observation, owing to bad definition of satellite; external contact good.
68, 69, 70 Considered good; clouds passing.
72 Cloudy; internal contact not seen.
73 Very exact.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

1878MNRAS..39....3T



| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. h m s | Corresponding G.M.T. h m s | Time by *Nautical Almanac.* h m s | Apparent Error of *Nautical Almanac.* m s | Power. |
|---|---|---|---|---|---|---|---|---|---|
| 76 | | | | Internal contact | 9 28 6·9 | 0 13 45·6 | | | 200 |
| 77 | June 28 9 30 | T. | II Sh. E. | About bisection | 9 29 38·9 | 0 15 17·6 | | | ,, |
| 78 | | | | Limb complete | 9 31 33·4 | 0 17 12·1 | 0 18 | | ,, |
| 79 | | | | External contact | 7 56 59·0 | 22 42 37·7 | | | ,, |
| 80 | July 2 8 0 | T. | I Oc. D. | About bisected | 7 58 39·0 | 22 44 17·7 | | | ,, |
| 81 | | | | Internal contact | 8 1 15·7 | 22 46 54·4 | 22 46 | | ,, |
| 82 | | | | Disappearance | 8 2 13·5 | 22 47 52·2 | | | ,, |
| 83 | | | | Internal contact | 7 17 15·2 | 22 2 53·9 | | | ,, |
| 84 | July 3 7 20 | T. | I Tr. E. | About bisected | 7 18 28·2 | 22 4 6·9 | | | ,, |
| 85 | | | | External contact | 7 20 15·2 | 22 5 53·9 | 22 8 | | ,, |
| 86 | | | | Internal contact | 7 36 18·2 | 22 21 56·9 | | | ,, |
| 87 | 7 38 | T. | I Sh. E. | About bisected | 7 37 30·2 | 22 23 8·9 | | | ,, |
| 88 | | | | Limb complete | 7 39 39·2 | 22 25 17·9 | 22 28 | | ,, |
| 89 | | | | External contact | 8 34 46·2 | 23 20 24·9 | 23 22 | | 300 |
| 90 | July 5 8 37 | T. | II Tr. I. | Bisected | 8 36 45·2 | 23 22 23·9 | | | ,, |
| 91 | | | | Internal contact | 8 38 44·2 | 23 24 22·9 | | | ,, |
| 92 | | | | First seen | 9 20 49·1 | 0 6 27·8 | 0 6 | | ,, |
| 93 | 9 23 | T. | II Sh. I. | About bisected | 9 22 27·6 | 0 8 6·3 | | | ,, |
| 94 | | | | Internal contact | 9 24 27·1 | 0 10 5·8 | | | ,, |

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95 | | | | | | Internal contact | 11 17 18·0 | 2 2 56·7 | | | | 200 |
| 96 | | 11 20 | T. | II | Tr. E. | About bisection | 11 19 8·0 | 2 4 46·7 | | | | ,, |
| 97 | | | | | | External contact | 11 21 31·5 | 2 7 10·2 | 2 9 | | | ,, |
| 98 | | | | | | Internal contact | 12 3 44·0 | 2 49 22·7 | | | | ,, |
| 99 | | 12 6 | T. | II | Sh. E. | Bisected | 12 5 38·0 | 2 51 16·7 | | | | ,, |
| 100 | | | | | | Limb complete | 12 7 55·5 | 2 53 34·2 | 2 54 | | | ,, |
| 101 | July 7 | 6 15 | T. | II | Ec. R. | | 6 14 44·2 | 21 0 22·9 | 21 1 52 | +1 29·1 | | ,, |
| 102 | | | | | | First seen | 6 54 53·3 | 21 40 32·0 | 21 40 53 | +0 21·0 | | ,, |
| 103 | July 11 | 6 57 | R. | I | Ec. R. | Quite distinct | 6 55 18·3 | 21 40 57·0 | | | | ,, |
| 104 | | | | | | Full blaze | 6 58 4·3 | 21 43 43·0 | | | | ,, |
| 105 | July 14 | 8 51 | T. | II | Ec. R. | | 8 50 38·0 | 23 36 16·7 | 23 37 50 | +1 33·3 | | ,, |

*Remarks.*

Ref. No.

79, 80, 81, 82 — The satellite disappeared behind the dark belt south of the equator, and was distinctly seen through the edge of the planet for the space of its full diameter, not finally disappearing till about one minute after internal contact, the occultation being effected at some distance within the limb. At $7^h\ 59^m\ 18^s$ and at $8^h\ 0^m\ 53^s$ the satellite was noted as partly behind or immersed in the planet and partly protruding as a small nipple on the limb.

85 — Satellite passed off north dark belt.

87 — Shadow traversed north dark belt.

89, 90, 91 — Very good observation; both planet and satellite well defined. The satellite just within the bright band north of the dark belt.

92, 93, 94 — Good observation; shadow very sharply defined. The satellite faintly visible opposite to a bright spot on south side of dark belt.

95, 96, 97 — Internal contact a little early. Planet not so well defined as at ingress. Foggy.

98, 99, 100 — Planet not very well defined, but observations considered good.

101 — Good, caught first glimmer. Observed also by R. with a 4-inch object-glass, time noted being $6^h\ 15^m\ 21^s{\cdot}9$ A.M. T.

102, 103, 104 — Planet not well defined, but observations considered good.

105 — Very good; caught first glimmer.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| Ref. No. | Date and Time. | | Observer. | Phenomenon. | | Phase of Phenomenon. | Adelaide Mean Time. h m s | Corresponding G.M.T. h m s | Time by *Nautical Almanac.* h m s | Apparent Error of *Nautical Almanac.* m s | Power. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106 | | | | | | Internal contact | 5 54 51·6 | 20 40 30·3 | | | 200 |
| 107 | July 19 | 5 57 | R. | I | Sh. E. | About bisected | 5 55 57·6 | 20 41 36·3 | | | ,, |
| 108 | | | | | | Limb complete | 5 57 27·6 | 20 43 6·3 | 20 46 | | ,, |
| 109 | | | | | | External contact | 7 12 29·8 | 21 58 8·5 | | | ,, |
| 110 | July 21 | 7 15 | T. | II | Oc. D. | About bisected | 7 14 48·8 | 22 0 27·5 | | | ,, |
| 111 | | | | | | Internal contact | 7 17 18·8 | 22 2 57·5 | 22 1 | | ,, |
| 112 | | 11 28 | T. | II | Ec. R. | First seen | 11 26 30·5 | 2 12 9·2 | 2 14 3 | +1 53·8 | ,, |
| 113 | | | | | | Full blaze | 11 31 3·5 | 2 16 42·2 | | | ,, |
| 114 | | | | | | First seen | 6 46 51·8 | 21 32 30·5 | 21 40 | | ,, |
| 115 | July 22 | 6 50 | T. | III | Oc. R. | About bisected | 6 49 21·8 | 21 35 0·5 | | | ,, |
| 116 | | | | | | External contact | 6 53 11·8 | 21 38 50·5 | | | ,, |
| 117 | | | | | | Becoming dim | 7 4 1·8 | 21 49 40·5 | | | ,, |
| 118 | | 7 10 | T. | III | Ec. D. | Sensibly dimmer | 7 5 32·8 | 21 51 11·5 | | | ,, |
| 119 | | | | | | Disappeared | 7 13 25·8 | 21 59 4·5 | 21 57 43 | −1 21·5 | ,, |
| 120 | | 9 50 | T. | III | Ec. R. | First seen | 9 48 33·6 | 0 34 12·3 | 0 38 25 | +4 12·7 | ,, |
| 121 | | | | | | Full blaze | 9 58 1·6 | 0 43 40·3 | | | ,, |
| 122 | | | | | | External contact | 10 20 55·2 | 1 6 33·9 | 1 9 | | ,, |
| 123 | July 24 | 10 20 | T. | I | Tr. I. | About bisected | 10 22 27·7 | 1 8 6·4 | | | ,, |
| 124 | | | | | | Internal contact | 10 24 52·2 | 1 10 30·9 | | | ,, |

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 125 | | | | | | First seen | 11 9 29·1 | 1 55 7·8 | 1 56 | | | „ |
| 126 | | 11 10 | T. | I | Sh. I. | About bisected | 11 10 54·6 | 1 56 33·3 | | | | „ |
| 127 | | | | | | Internal contact | 11 12 51·6 | 1 58 30·3 | | | | „ |
| 128 | July 25 | 7 41 | T. | I | Oc. D. | External contact | 7 41 4·2 | 22 26 42·9 | | | | 300 |
| 129 | | | | | | Disappeared | 7 44 45·2 | 22 30 23·9 | 22 28 | | | „ |
| 130 | | | | | | External contact | 9 31 20·1 | 0 16 58·8 | | | | 200 |
| 131 | July 28 | 9 38 | T. | II | Oc. D. | About bisected | 9 33 58·1 | 0 19 36·8 | | | | „ |
| 132 | | | | | | Disappeared | 9 37 9·1 | 0 22 47·8 | 0 21 | | | „ |

*Remarks.*

Ref. No.

106, 107, 108 — Very good; shadow traversed dark band.

109, 110, 111 — Very good; planet well defined. Satellite disappeared a little south of southern dark belt, behind a bank of white cloud, and at times I thought I could see the whole of the satellite immersed in the planet up to internal contact.

112 Good; a mere speck of light.

114 Time late.

116 Good. Planet and satellite well defined.

117, 118, 119 — The disk of the satellite was very sharply defined. The time first noted is when I first observed an alteration in the outline of the disk, the altered form being well marked at the second time, when the shadow appeared to extend over nearly one-third of the disk. The satellite was reduced to a mere speck of light for at least a minute before disappearance, and I lost sight of it for a few seconds about 10 seconds before the time noted (119) but caught it again, and the time given must be very exact.

120 Good; seen instantly.

121 Disk perfect.

122, 123, 124 — Bad definition.

125, 126, 127 — External contact doubtful; definition wretched.

128, 129 — Not good, clouds interfering; satellite disappeared behind a bright white cloud belt.

130 Not very good.

131 Not very good.

132 Exact.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

1878MNRAS..39....3T

| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. h m s | Corresponding G.M.T. h m s | Time by *Nautical Almanac.* h m s | Apparent Error of *Nautical Almanac.* m s | Power. |
|---|---|---|---|---|---|---|---|---|---|
| 133 | | | | External contact | 7 30 49·8 | 22 16 28·5 | | | 200 |
| 134 | July 29 7 42 | T. | III Oc. D. | About bisected | 7 35 44·8 | 22 21 23·5 | | | ,, |
| 135 | | | | Disappeared | 7 41 24·8 | 22 27 3·5 | 22 22 | | ,, |
| 136 | | | | First seen | 10 16 14·4 | 1 1 53·1 | 1 8 | | ,, |
| 137 | 10 17 | T. | III Oc. R. | About bisected | 10 20 4·4 | 1 5 43·1 | | | ,, |
| 138 | | | | External contact | 10 25 14·4 | 1 10 53·1 | | | ,, |
| 139 | | | | First seen | 6 28 17·5 | 21 13 56·2 | 21 13 | | ,, |
| 140 | July 30 6 30 | T. | II Sh. I. | About bisected | 6 29 3·0 | 21 14 41·7 | | | ,, |
| 141 | | | | Internal contact | 6 31 3·0 | 21 16 41·7 | | | ,, |
| 142 | | | | External contact | 9 29 28·5 | 0 15 7·2 | | | ,, |
| 143 | Aug. 1 9 30 | T. | I Oc. D. | About bisected | 9 31 7·5 | 0 16 46·2 | | | ,, |
| 144 | | | | Disappeared | 9 32 34·5 | 0 18 13·2 | 0 16 | | ,, |
| 145 | | | | External contact | 6 36 38·4 | 21 22 17·1 | 21 23 | | ,, |
| 146 | Aug. 2 6 37 | T. | I Tr. I. | About bisection | 6 38 19·9 | 21 23 58·6 | | | ,, |
| 147 | | | | Internal contact | 6 40 3·9 | 21 25 42·6 | | | ,, |
| 148 | | | | External contact | | | 22 19 | | ,, |
| 149 | 7 37 | T. | I Sh. I. | Internal contact | 7 36 23·8 | 22 22 2·5 | | | ,, |
| 150 | | | | Internal contact | 8 48 27·6 | 23 34 6·3 | | | ,, |
| 151 | 8 50 | T. | I Tr. E. | About bisected | 8 50 30·6 | 23 36 9·3 | | | ,, |
| 152 | | | | External contact | 8 52 58·6 | 23 38 37·3 | 23 39 | | ,, |

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 153 | | | | | | | Internal contact | | | | | | ,, |
| 154 | | | 9 49 | T. | I | Sh. E. | About bisected | 9 46 57·0 | | 0 32 35·7 | | | ,, |
| 155 | | | | | | | Limb complete | 9 48 15·0 | | 0 33 53·7 | 0 36 | | ,, |
| 156 | | | | | | | First seen | 5 58 6·5 | | 20 43 45·2 | 20 45 23 | +1 37·8 | ,, |
| 157 | Aug. | 8 | 6 0 | R. | II | Ec. R. | Quite distinct | 5 58 29·5 | | 20 44 8·2 | | | ,, |
| 158 | | | | | | | Full blaze ? | 6 0 39·5 | | 20 46 18·2 | | | ,, |
| 159 | | | | | | | External contact | 11 17 24·8 | | 2 3 3·5 | | | ,, |
| 160 | | | 11 20 | T. | I | Oc. D. | About bisected | 11 19 11·8 | | 2 4 50·5 | | | ,, |
| 161 | | | | | | | Disappearance | 11 21 15·8 | | 2 6 54·5 | 2 4 | | ,, |

*Remarks.*

Ref. No.

133 Good.

134 Good.

135 Exact.

136 A little late; badly defined.

138 Good, but planet badly defined.

139, 140, 141 Very badly defined; not considered good.

142, 143, 144 External contact considered late; disappearance very exact. Planet and satellite well defined. The satellite disappeared behind and about the middle of the dark belt south of the equator. The dark belts on either side of the equator were hazy and seemingly covered with a thin cloud. The occultation was perfect at limb. No appearance of satellite as it passed behind the planet, but the Jovian clouds appeared denser than usual.

Ref. No.

145, 146, 147 Very steady, and times noted considered very exact. The dark belts appeared to be covered with a thin film of cloud, or as if seen through fog.

149 Good. *Vide* description and sketch.

153 Lost; late.

154, 155 Not good.

156, 157, 158 Good.

159, 160, 161 External contact (159) very good, disappearance (161) very exact; steady and well defined. The occultation perfect; satellite not visible through limb. The brown belts have still the hazy appearance noted on previous nights—as if covered with a thin film of cloud.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

1878MNRAS..39....3T

| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. h m s | Corresponding G.M.T. h m s | Time by *Nautical Almanac.* h m s | Apparent Error of *Nautical Almanac.* m s | Power. |
|---|---|---|---|---|---|---|---|---|---|
| 162 | | | | External contact | 8 24 40·9 | 23 10 19·6 | 23 12 | | 200 |
| 163 | Aug. 9 8 26 | T. | I Tr. I. | About bisected | 8 26 51·9 | 23 12 30·6 | | | ,, |
| 164 | | | | Internal contact | 8 28 25·9 | 23 14 4·6 | | | ,, |
| 165 | | | | First seen | 9 28 17·8 | 0 13 56·5 | 0 14 | | ,, |
| 166 | 9 30 | T. | I Sh. I. | About bisected | 9 28 59·8 | 0 14 38·5 | | | ,, |
| 167 | | | | Internal contact | 9 31 23·8 | 0 17 2·5 | | | ,, |
| 168 | Aug. 11 6 10 | T. | I Sh. E. | About bisected | 6 9 54·4 | 20 55 33·1 | | | ,, |
| 169 | | | | Limb complete | 6 11 25·4 | 20 57 4·1 | 21 0 | | ,, |
| 170 | | | | External contact | 9 24 38·6 | 0 10 17·3 | 0 11 | | ,, |
| 171 | Aug. 13 9 27 | T. | II Tr. I. | About bisected | 9 27 12·1 | 0 12 50·8 | | | ,, |
| 172 | | | | Internal contact | 9 30 13·1 | 0 15 51·8 | | | ,, |
| 173 | Aug. 15 8 35 | T. | II Ec. R. | First seen | 8 35 8·1 | 23 20 46·8 | 23 22 25 | +1 38·2 | ,, |
| 174 | | | | Full blaze? | 8 40 30·6 | 23 26 9·3 | | | ,, |
| 175 | | | | Internal contact | 7 6 7·5 | 21 51 46·2 | | | ,, |
| 176 | Aug. 16 7 10 | T. | III Tr. E. | About bisected | 7 8 48·5 | 21 54 27·2 | | | ,, |
| 177 | | | | External contact | 7 12 37·5 | 21 58 16·2 | 22 1 | | ,, |
| 178 | | | | First seen | 8 56 55·8 | 23 42 34·5 | 23 45 | | ,, |
| 179 | 9 0 | T. | III Sh. I. | About bisected | 8 59 35·3 | 23 45 14·0 | | | ,, |
| 180 | | | | Internal contact | 9 5 27·3 | 23 51 6·0 | | | ,, |

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 181 | | | | | | External contact | 10 | 13 | 22·2 | 0 59 0·9 | 1 2 | ,, |
| 182 | | 10 16 | T. | I | Tr. I. | About bisected | 10 | 15 | 40·2 | 1 1 18·9 | | ,, |
| 183 | | | | | | Internal contact | 10 | 18 | 19·7 | 1 3 58·4 | | ,, |
| 184 | | | | | | First seen | 11 | 22 | 38·5 | 2 8 17·2 | 2 9 | 300 |
| 185 | | 11 25 | T. | I | Sh. I. | About bisected | 11 | 25 | 0·0 | 2 10 38·7 | | ,, |
| 186 | | | | | | Internal contact | 11 | 26 | 59·5 | 2 12 38·2 | | ,, |
| 187 | | | | | | Internal contact | 10 | 48 | 8·6 | 1 33 47·3 | | 200 |
| 188 | Aug. 23 | 10 53 | T. | III | Tr. E. | About bisected | 10 | 51 | 34·1 | 1 37 12·8 | | ,, |
| 189 | | | | | | External contact | 10 | 56 | 17·1 | 1 41 55·8 | 1 44 | ,, |

*Remarks.*

Ref. No.
162, 163, 164 — Planet very tremulous and ill defined.
165, 166, 167 — Well defined; limb slightly indented when shadow first seen. The internal contact (167) considered good.
168, 169 — Well defined; internal contact lost; came too late to instrument.
170, 171, 172 — Not well defined; external contact (170) and bisection (171) fair, and internal contact (172) very good.
173, 174 — First seen as a mere speck; very good observation; well defined.
175 — Late.

Ref. No.
177 — Very good; well defined.
178, 179, 180 — Very good; well defined.
181, 182, 183 — Very good; well defined.
184, 185, 186 — Not good; definition wretched.
187, 188, 189 — Satellite steady, but limb of planet rather tremulous.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

1878MNRAS..39....3T

| Ref. No. | Date and Time. | Observer. | Phenomenon. | Phase of Phenomenon. | Adelaide Mean Time. | Corresponding G.M.T. | Time by *Nautical Almanac.* | Apparent Error of *Nautical Almanac.* | Power. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | h m s | h m s | h m s | m s | |
| 190 | | | | Limb indented | 7 47 41·5 | 22 33 20·2 | 22 34 | | 200 |
| 191 | Aug. 25 7 50 | T. | I Sh. I. | About bisected | 7 48 32·5 | 22 34 11·2 | | | ,, |
| 192 | | | | Internal contact | 7 50 14·5 | 22 35 53·2 | | | ,, |
| 193 | | | | Internal contact | 9 57 15·7 | 0 42 54·4 | | | ,, |
| 194 | 10 0 | T. | I Sh. E. | About bisected | 9 58 36·7 | 0 44 15·4 | | | ,, |
| 195 | | | | Limb complete | 10 0 11·2 | 0 45 49·9 | 0 50 | | ,, |
| 196 | Aug. 26 7 23 | T. | I Ec. R. | First seen | 7 21 36·1 | 22 7 14·8 | 22 7 46 | +0 31·2 | ,, |
| 197 | | | | Full blaze | 7 25 10·6 | 22 10 49·3 | | | ,, |
| 198 | Aug. 29 8 0 | T. | IV Ec. D. | | | | 22 37 58 | | ,, |
| 199 | | | | External contact | 8 29 2·1 | 23 14 40·8 | | | ,, |
| 200 | 8 32 | R. | II Oc. D. | About bisected | 8 31 6·1 | 23 16 44·8 | | | ,, |
| 201 | | | | Internal contact | 8 33 59·9 | 23 19 38·6 | 23 18 | | ,, |
| 202 | | | | External contact | 7 53 8·4 | 22 38 47·1 | | | ,, |
| 203 | Oct. 2 7 55 | T. | I Oc. D. | About bisection | 7 54 53·4 | 22 40 32·1 | | | ,, |
| 204 | | | | Disappearance | 7 56 51·4 | 22 42 30·1 | 22 41 | | ,, |
| 205 | | | | External contact | | | 23 4 | | 125 |
| 206 | Oct. 10 8 20 | T. | I Sh. I. | Bisected | 8 19 6·0 | 23 4 44·7 | | | ,, |
| 207 | | | | Internal contact | 8 20 58·0 | 23 6 36·7 | | | ,, |
| 208 | 9 23 | T. | I Tr. E. | Internal contact | 9 20 48·8 | 0 6 27·5 | | | ,, |
| 209 | | | | External contact | 9 24 55·8 | 0 10 34·5 | 0 8 | | ,, |

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 210 | Oct. 11 | 7 50 | R. | I | Ec. R. | First seen | 7 49 31·8 | 22 35 10·5 | 22 35 22 | +0 11·5 | 200 |
| 211 | | | | | | Full blaze ? | 7 51 6·8 | 22 36 45·5 | | | ,, |
| 212 | Oct. 23 | 9 25 | T. | III | Oc. R. | First seen | 9 25 20·6 | 0 10 59·3 | 0 17 | | ,, |
| 213 | | | | | | About bisected | 9 30 28·6 | 0 16 7·3 | | | ,, |
| 214 | | | | | | Full blaze | 9 37 22·6 | 0 23 1·3 | | | ,, |
| 215 | Nov. 4 | 7 47 | T. | IV | Ec. D. | Half in shade | 7 30 44·3 | 22 16 23·0 | | | ,, |
| 216 | | | | | | Excessively faint | 7 44 14·3 | 22 29 53·0 | | | ,, |
| 217 | | | | | | Still visible | 7 46 14·3 | 22 31 53·0 | | | ,, |
| 218 | | | | | | Disappeared | 7 46 35·8 | 22 32 14·5 | 22 26 30 | −5 44·5 | ,, |

*Remarks.*

Ref. No.

190 Late.

192 Good; planet unsteady.

193 Very good.

196 Very good.

198 The satellite never disappeared, but was reduced to a mere speck of light skirting margin of shadow.

199, 200, 201 Good; planet well defined and steady. The satellite disappeared behind the south dark belt, but was visible through the limb for about a minute after noted time of internal contact (201).

202, 203, 204 Not very good; planet ill defined and unsteady. The shadow of Satellite II indistinct.

205 Lost.

206, 207 Very good.

208, 209 Wretchedly defined.

210, 211 Planet very unsteady and ill defined; satellite when first seen quite distinct.

212 Supposed to be a little late. When the satellite was first seen it was sensibly separated from the limb or edge of planet, which, however, was not very well defined.

215, 216, 217, 218 Good; very steady. Planet and satellites beautifully defined; disks of latter distinctly visible. Progress of eclipse closely watched, and the instant of disappearance considered very exact.

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

Downloaded from http://mnras.oxfordjournals.org/ at University of Birmingham on June 5, 2015